Title: Pizza Party

Brief Overview:

Students will identify and compare fractions. They will identify and write equivalent fractions. Students will gather data to create a graph that shows choices made in planning a pizza party for their class.

NCTM 2000 Principles for School Mathematics:

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

- **Content Standards**

  Number and Operations
  - *Understand numbers, ways of representing numbers, relationships among numbers, and number systems.*

  Geometry
  - *Use visualization, spatial reasoning, and geometric modeling to solve problems.*

  Measurement
  - *Understand measurable attributes of objects and the units, systems, and processes of measurement.*
  - *Apply appropriate techniques and tools to determine measurements.*

  Data Analysis and Probability

- *Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.*

- **Process Standards**

  Problem Solving
  - *Build new mathematical knowledge through problem solving.*
  - *Solve problems that arise in mathematics and in other contexts.*
  - *Apply and adapt a variety of appropriate strategies to solve problems.*
  - *Monitor and reflect on the process of mathematical problem solving.*

  Reasoning and Proof
  - *Recognize reasoning and proof as fundamental aspects of mathematics.*
  - *Make and investigate mathematical conjectures.*
  - *Develop and evaluate mathematical arguments and proofs.*
  - *Select and use various types of reasoning and methods of proof.*

  Communication
  - *Organize and consolidate their mathematical thinking through communication.*
  - *Communicate their mathematical thinking, coherently and clearly to peers, teacher, and others.*
  - *Use the language of mathematics to express mathematical ideas precisely.*

  Connections
  - *Recognize and use connections among mathematical ideas.*
  - *Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.*
  - *Recognize and apply mathematics in contexts outside of mathematics.*

  Representation
  - *Create and use representations to organize, record, and communicate mathematical ideas.*
  - *Select, apply, and translate among mathematical representations to solve problems.*

Grade/Level:

Grade 3

Duration/Length:

Three to four days

Prerequisite Knowledge:

Students should have prior knowledge of and ability to:

- Recognize the whole and its parts (sharing)
- Identify equal and unequal parts
- Understand the meaning of some vocabulary words: fair shares, numerator, denominator, and unit fractions
- Understand and correctly use the components of a graph.

Student Outcomes:

Students will be able to:

- identify equal parts of a whole and write them in fraction form.
- compare fractions.
- identify equivalent fractions.
- use fractions in everyday situations to solve problems.

Materials/Resources/Printed Materials:

- Pattern Blocks
- Fraction Circles Set
- Square Fraction Set
- Construction Paper, scissors, glue stick, crayons
- Student Resource Sheets (1a, 1, 2, 3, 4)

Development/Procedures:

Day 1

- Teacher will introduce new unit about fractions. After a short group discussion about fractions complete a KWL with student and administer pre-test. (Student Resource Sheet #1a)
- Students will work in pairs using **Pattern Blocks**, which include hexagons, small triangles, trapezoids, rhombi to compare parts of a whole. Using the hexagon as the **whole**, students will use shapes to find unit fractions. For example, students will find out that 2 trapezoids equal 1 hexagon; 6 triangles equal 1 hexagon; 3 rhombi equal 1 hexagon. Students will record their findings writing the unit fractions to communicate their results: 1/2 hexagon equals 1 trapezoid, 1/3 hexagon equals 1 rhombus. The students will then work in **cooperative groups** of four to share their findings.
- Using the classroom population as the **whole,** students will be asked to find the set of students that represent 1/2, 1/3, 1/4 of the classroom. Students will draw pictures to show their findings.

- To reinforce this skill and provide practice in finding fractional parts of a whole, students will complete Student Resource Sheet #1.

  Day 2

- Using the circle fractions set and the square fraction set, students will work in pairs to find equivalent fractions. Each group of students will be given a set of circle fractions or a set of square fractions. Students will be asked to spread all of the parts on their desk and work together to find equivalent fractions for ½, 1/3, ¼. Students should record their answers in their math journals. For example, students should be able to discover by using their manipulative that 1/2 equals 2/4, 3/6, 4/8, and 5/10. Use the same procedure for the fractions 1/3 and 1/4.
- Students will play the Fraction Concentration Game with a partner. Using the Fraction Concentration Game squares found on Student Resource Sheet #2, students will work in pairs to make a deck of cards. Students will cut out all of the cards and paste them on a piece of construction paper. When the entire deck has been made, students will place all of the cards facedown on their desk. They will then take turns picking out a card and then picking another card that shows its equivalent fraction. If the two cards match (show equivalent fractions) the player keeps the cards and continues to select two more cards. If the two cards are not equivalent, the player puts the cards on the desk and then second player gets a turn. Students play until all cards have been selected. The person with the most cards wins the game.
- Students will complete Student Resource Sheet #3. They will color each shape and write equivalent fractions.

  Day 3

- Students will work as a whole class to plan a class pizza party.
- The teacher will announce that students will plan a class party using their knowledge of fractions to help in the planning.
- The class must find out how much pizza must be ordered so that each student receives two slices of pizza.
- The class must also decide what kinds or combinations of pizza slices must be ordered using the toppings pepperoni, cheese, and sausage so that each student will get his favorite topping.
- Students will be asked to make a survey of the class to find out what kind of topping students prefer.
- Students will complete Student Resource Sheet #4.
- Once they have gathered their data, and completed Student Resource Sheet #4, students will work in cooperative groups to make a bar graph to show their results.
- Students will summarize the results of their findings and write results in fractional terms on a class chart.
- Using this data, pizzas will be ordered for the class.

Performance Assessment:

Look for performance assessment rubric in teacher resource #1.

Extension/Follow Up:

- Students will be asked to find the number of pizzas that should be ordered if some students decide that they only want one slice of pizza. How will this affect the number of pizzas ordered?
- Using the number of people in their families, have students determine the number of pizzas and types of toppings that should be ordered for their families, so that each family member receives two slices or as many as they can consume.
- Additional resource-Pizza Party-a Versatile Fraction Game by Ideal Co. This is a realistic pizza game that will motivate students to learn more about equivalent fractions through an everyday, real life experience.

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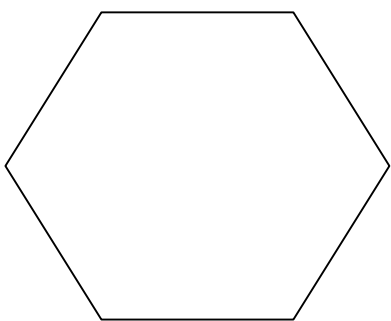Name: _____

Match each word with its meaning.

1. _____ Fair Share

(A) a fraction that has one as its numerator.

2. _____Unit Fraction

(B) to divide so that all parts represent the same amount.

3. _____ Equivalent fractions

(C) the top number in fractions that tells how many parts.

4. _____ Numerator

(D) two fractions that represent the same amount.

5. _____ Denominator

(E) the bottom number of fraction that represents the number of pieces the whole is being divide into.

Draw and label a picture to show each term.

Name: _____ Date: _____

This is the whole.

How many of these shapes equal the whole?
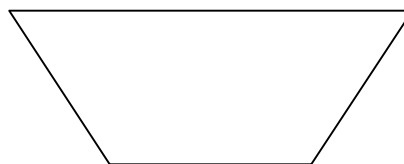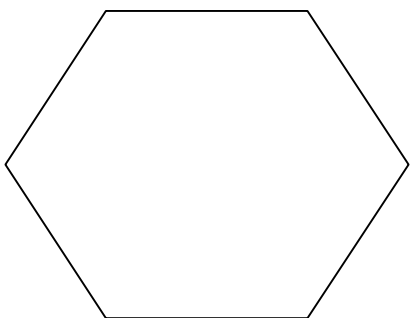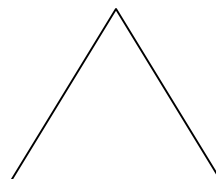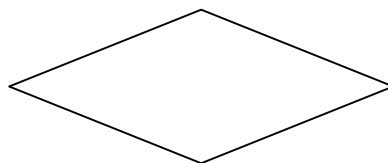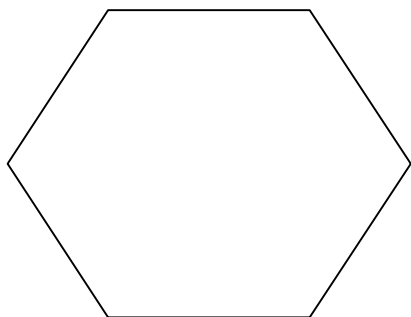
$\dfrac{1}{2}$	$\dfrac{1}{3}$
$\dfrac{1}{4}$	$\dfrac{5}{10}$
$\dfrac{2}{8}$	$\dfrac{1}{5}$
$\dfrac{1}{2}$	$\dfrac{1}{4}$
$\dfrac{2}{5}$	$\dfrac{1}{3}$

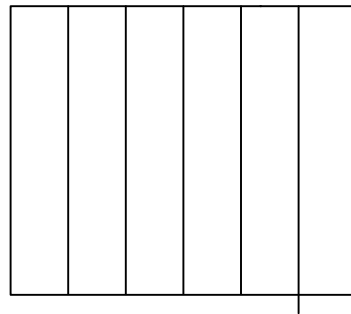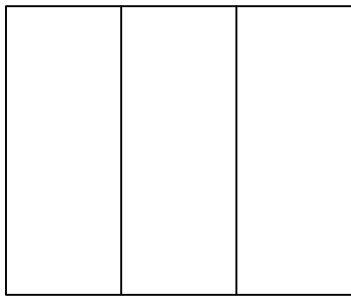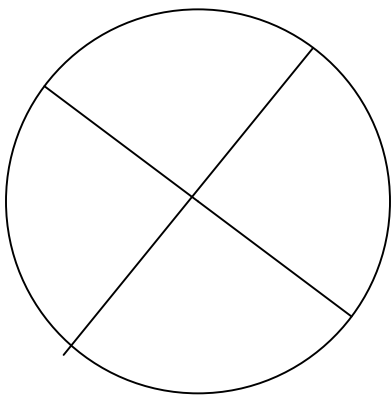|	
$\frac{3}{9}$	$\frac{3}{12}$
$\frac{4}{8}$	$\frac{1}{3}$
$\frac{4}{12}$	$\frac{2}{4}$
$\frac{1}{4}$	$\frac{1}{2}$
$\frac{2}{6}$	$\frac{4}{16}$

Name: _____   Student Resource Sheet #3

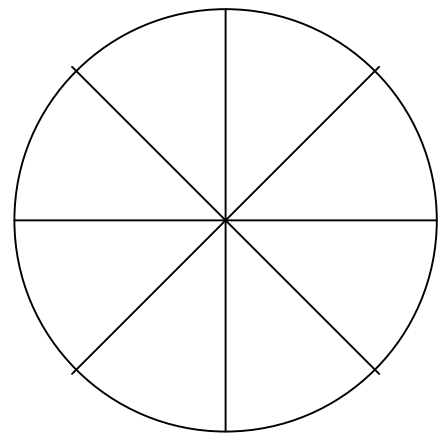**Using these shapes, color and write equivalent fractions for each pair.**

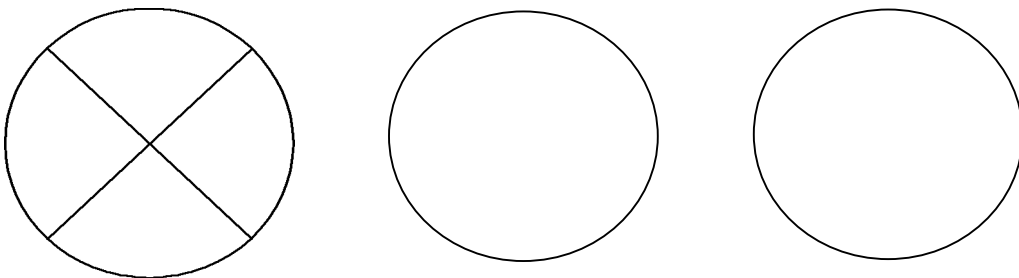1/2 = _____

1/3 = _____

1/4 = _____
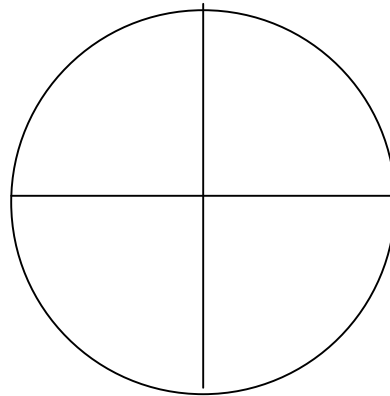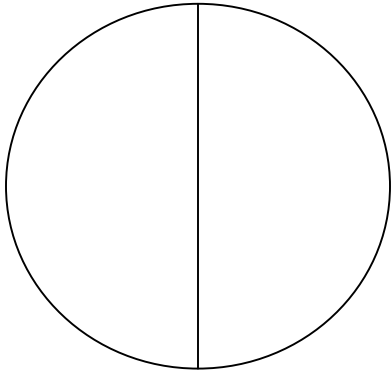
Name: _____

1. There are 24 students in the class Using the information from the survey design the pizzas needed using different toppings. Draw lines to divide pizzas so that each student will have a fair share.
    Use the circles below to show your work.
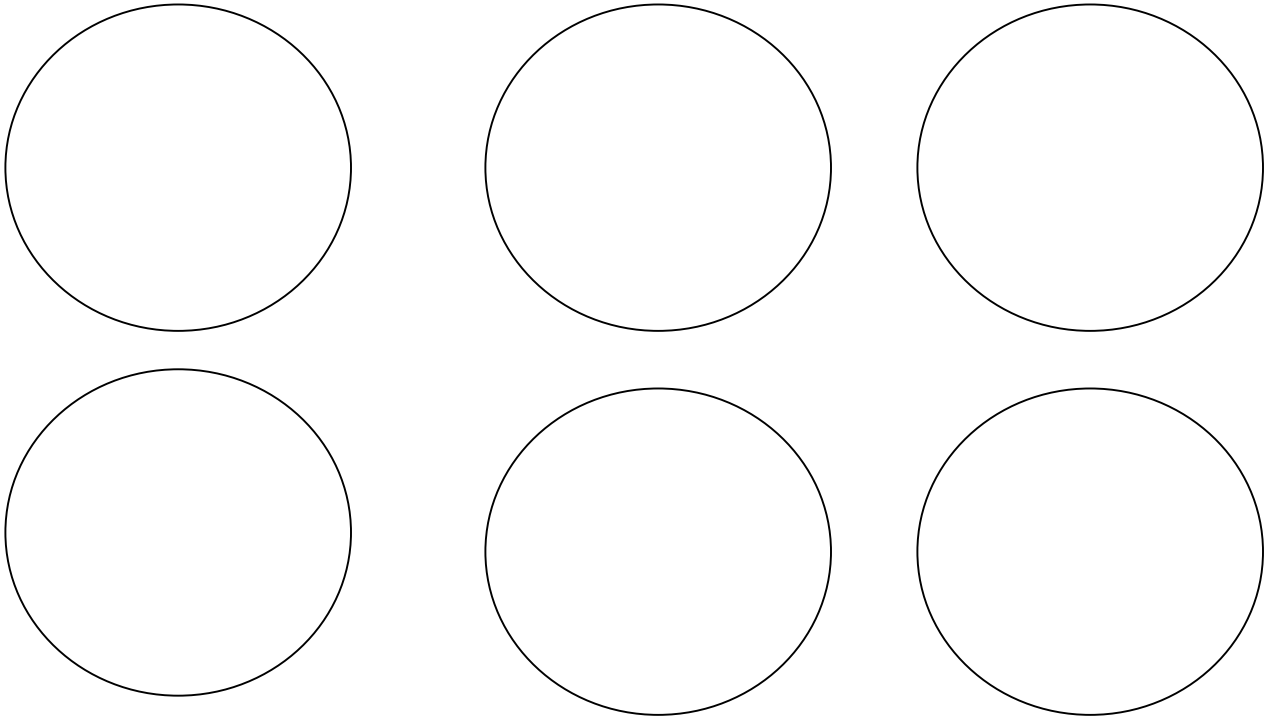
2. Explain your answer in sentence form
    _____
    _____
    _____

3. Another student cut a pizza into fourths. Draw and label two more pizzas to show the same amount. (equivalent fractions)

Rubric for Pizza Party

Student Ability	4	3	2	1
Able to define vocabulary words: Numerator, Denominator, Unit/ Fraction, Fare Share, Equivalent Fraction	90%-100% accomplishment Able to understand all vocabulary words and make connections. Communication is clear.	80% - 89% substantial accomplishment. Able to understand 4-5 vocabulary words and makes some connections. Communication is not all clear.	70% - 79% partial accomplishment. Able to understand 3-4 vocabulary words and makes some connections. Communication is limited.	Below 69% little to no accomplishment. Able to understand 0 –2 vocabulary words. Can not make connections. Not able to communicate.
Able to make equal parts, identifies and explains their relationship to the whole.	90%-100% accomplishment The procedure and purpose are accurate. Communication and connection are clear and understood.	80% - 89% substantial accomplishment. Procedure is almost accurate. Communication is clear. Connection is not clear.	70% - 79% partial accomplishment. Able to make equal parts. Connection and communication are not clear.	Below 69% Little to no accomplishment. Not able to understand or communicate the connection between equal parts and the whole.
Able to reason identify and make equivalent fractions	90% - 100% accomplishment. Able to reason, identify and make Equivalent fractions. Communication and connections are clear.	80% - 89% substantial accomplishment. Procedure is almost accurate. Communication is clear. Connection is not clear.	70% – 79% partial accomplishment. Able to make some equivalent fractions. Connection is not clear. Communication is limited.	Below 69% Little to no accomplishment. Not able to understand or communicate the connection between equivalent fractions.
Able to determine what fractional parts and wholes are needed to place an order for the Pizza Party by collecting data & constructing a graph.	90% - 100% accomplishment. Able to collect data and make a graph to place order accurately.	80% - 89% substantial accomplishment. Able to collect all the data. Organization & interpretation of data is lacking.	70% - 79% partial accomplishment. Able to collect some data but can not complete the graph to place order.	Below 69% Little to no accomplishment. Not able to collect data and make graph. Does not understand the concepts or connection to place the order.